

EGU21-7387

<https://doi.org/10.5194/egusphere-egu21-7387>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



## Impacts of climate and land use changes on the erosion processes in a Mediterranean agricultural catchment (Northern Morocco)

**Hamza Briak**<sup>1</sup>, Rachid Moussadek<sup>2,3</sup>, Khadija Aboumaria<sup>4</sup>, Fassil Kebede<sup>1</sup>, and Rachid Mrabet<sup>2</sup>

<sup>1</sup>Mohammed VI Polytechnic University (UM6P), CESFRA, AgroBioSciences, 43150 Benguerir, Morocco

(hamza.briak@um6p.ma)

<sup>2</sup>National Institute for Agricultural Research (INRA), 10000 Rabat, Morocco

<sup>3</sup>International Centre for Agricultural Research in the Dry Areas (ICARDA), 10000 Rabat, Morocco

<sup>4</sup>Abdelmalek Essaadi University (UAE), Faculty of Sciences and Techniques (FST), 90000 Tangier, Morocco

Recent studies on vulnerability to climate and land use change show a trend towards increased aridity accelerating soil erosion which is the primary factor to be considered by decision makers in the environmental field. Furthermore, to reduce the soil erosion intensity, it is required to clarify the sources zones of sediment yield where soil conservation works have to focus on. The model selected for this work is the Soil and Water Assessment Tool (SWAT) which is one of many models widely used to assess soil erosion risk and simulate conservation measures efficiency. In fact, the objective of this work is to evaluate the effects of different agricultural Best Management Practices (BMPs) on sediments using SWAT model in the Kalaya river basin located in the North of Morocco in order to recommend the most appropriate one. The model was calibrated and validated using observed data of flow and sediment concentration; the performance of the model was evaluated using statistical methods and the total soil erosion rate was estimated by this model in the study area. However, we concentrated on the representation of three interesting and most usable practices by the SWAT model: contouring, strip-cropping and terracing. The general parameters of the model have been modified to reflect the implementation of four different BMPs. The modification of these parameters was based on previous research and modeling efforts conducted in watersheds. Resulting sediment yield were compared with the result of simulation of the baseline scenario (existing conditions). In fact, effective measures to reduce sediment losses at the watershed level are organized according to their effectiveness, and these are terracing (28% reduction and the value is 15t/ha/y) followed by strip-cropping (9% reduction and the value is 5t/ha/y). On the other hand, measurements performed by the contouring are inappropriate for the study area because they have contributed to increasing the soil erosion (more than 31% of losses and the value is 17t/ha/y more than existing conditions). The mean annual values of sediment yields obtained for scenarios with and without BMPs were compared to assess the effectiveness of BMPs. Among all other practices, terracing was the most effective BMPs for reducing sediments which is perfectly recommended in the Mediterranean regions in general to avoid the risk of damage during intense rainfall. These results indicates that the use of terracing on agricultural land can potentially make improvements marked the control and limitation of soil erosion, and it also affords useful information for involved stakeholders in water and soil

conservation activities for targeted management.